

Remarks:

Reconsideration of the application is requested.

Claims 1-10 and 15 remain in the application. Claim 15 has been amended. Claims 1-10 have been withdrawn from consideration at this time.

In item 3 on pages 2-3 of the above-mentioned Office action, claims 15 and 17 have been rejected as being unpatentable over Yamagishi et al. (Japanese Patent Application JP 6-291239) in view of Komata et al. (Japanese Patent Application JP 2-15897) and Bacon et al. (US Pat. No. 5,234,153) under 35 U.S.C. § 103(a).

The rejection has been noted and claim 15 has been amended in an effort to even more clearly define the invention of the instant application. More specifically, the feature of claim 17 has been added to claim 15.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 15 calls for, inter alia:

said solder containing a gold-tin compound (AuSn) having a composition by weight of Au to Sn of 70 to 30 and forming a layer having a thickness of from about 1 μm to about 2 μm .

As can be clearly seen from Fig. 1(C) of Yamagishi et al., a brazing material 8 of eutectic gold-tin alloy is used between the housing 5 of a chip 4 and a substrate 1 and between a lead pin 2 and a pin bearing pad 3. There is no brazing material between the chip 4 and the substrate 1.

Therefore, the important feature of the invention of the instant application, namely the direct connection of a semiconductor body with a substrate over a thin gold-tin solder layer with a hypereutectic gold-tin-alloy having a composition by weight of Au to Sn of 70 to 30 and a layer thickness of 1-2 μm , is not disclosed by Yamagishi et al. The same also applies to the other cited references.

Although Komata et al. disclose a gold-tin-alloy with a tin content of 12-37% by weight, this reference does not disclose the gold-tin composition of 70:30, which is especially advantageous for thin layer soldering in improving flow properties of the solder while maintaining the low melting temperature of the solder. See page 5, lines 5-14, page 6, lines 5-10 and page 7, line 15 to page 16, line 21 of the specification of the instant application.

A eutectic gold-tin mixture typically has a gold-tin composition of 80:20. Since the tin content of 12-20% of the range 12-37% disclosed by Komata et al. does not produce a

hypereutectic gold-tin alloy and the 30% of tin as recited in claim 15 of the instant application is clearly within the hypereutectic region, it is clear that Komata et al. do not recognize the advantage of a hypereutectic gold-tin alloy over a eutectic gold-tin alloy.

Bacon et al. disclose a gold-tin solder layer 24 (75% gold and 25% tin by weight) with a layer thickness of about $5\mu\text{m}$ between a nickel-tin layer 23 and a gold layer 13 in a laser device (see column 5, lines 36-61 and column 6, lines 44-46). A semiconductor chip 10 of the laser device is clearly distant from those layers 13, 24, 23, because additional layers 11, 12 and an ohmic contact layer 10.5 are disposed therebetween. The layer 11 is made of titanium, whereas the layer 12 has platinum. Clearly, Bacon et al. do not disclose a direct connection of a semiconductor body with a substrate as recited in claim 15 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 15. Claim 15 is, therefore, believed to be patentable over the art.

In item 4 on pages 3-4 of the above-mentioned Office action, claims 15 and 17 have been rejected as being unpatentable over

Yamagishi et al. in view of Ivey et al. (US Pat. No. 6,245,208) and Bacon et al. under 35 U.S.C. § 103(a).

Applicant respectfully believes that the reference Ivey et al. is not prior art with respect to the instant application. The instant application is a continuation of copending international application PCT/DE98/01737, filed June 24, 1998. Pursuant to 35 U.S.C. § 363, the instant application has a filing date of June 24, 1998, because the instant application designated the United States. This date is prior to Ivey et al.'s U.S. filing date. Accordingly, the reference Ivey et al. is unavailable as prior art.

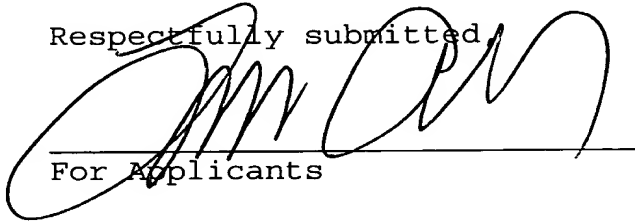
Therefore, applicant respectfully submits that the rejection in item 4 on pages 3-4 of the Office action under Section 103 is moot.

In view of the foregoing, reconsideration and allowance of claim 15 are solicited.

If an extension of time for this paper is required, petition for extension is herewith made. Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the

Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,



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Marked-Up Version of the Amended Claims:

Claim 15 (twice amended). A semiconductor component,
comprising:

a solder containing at least two components with at least two metal-containing constituents including a first constituent X being formed of a precious metal and a second constituent Y being consumed during a soldering operation by one of reacting and being dissolved in materials which are to be joined, and said solder having a hypereutectic concentration of said second constituent Y;

a substrate; and

a semiconductor chip secured to said substrate by one of alloying and brazing using said solder,

said solder containing a gold-tin compound (AuSn) [with a hypereutectic Sn concentration] having a composition by weight of Au to Sn of 70 to 30 and forming a layer having a thickness of from about 1 μm to about 2 μm .